

IN THE CLAIMS

1. (canceled)
2. (previously presented) A doped aluminum oxide layer, comprising:
an aluminum oxide layer having pores on a surface; and
a dopant material filling the pores;
wherein the dopant material is selected from the group consisting of silicon, zirconium, hafnium and titanium;
wherein the dopant material is applied to the aluminum oxide layer subsequent to a formation of the aluminum oxide layer such that the dopant material is not dispersed throughout the aluminum oxide layer; and
wherein the aluminum oxide layer further includes voids below the surface and wherein the voids are free of the dopant material.
- 3-5 (canceled)
6. (currently amended) The doped aluminum oxide layer of claim ~~1~~ 2, wherein the aluminum oxide layer has a packing density between approximately 0.65 and 0.999.
7. (currently amended) The doped aluminum oxide layer of claim ~~1~~ 2, wherein the aluminum oxide layer has a packing density between approximately 0.85 and 0.999.
8. (currently amended) The doped aluminum oxide layer of claim ~~1~~ 2, wherein the dopant material constitutes approximately 0.1% to 30% by weight of the doped aluminum oxide layer.
9. (currently amended) The doped aluminum oxide layer of claim ~~1~~ 2, wherein the dopant material constitutes approximately 0.1% to 10% by weight of the doped aluminum oxide layer.

10. (currently amended) The doped aluminum oxide layer of claim-~~1~~2, wherein the aluminum oxide layer has a degree of porosity such that the dopant material filling the pores of the aluminum oxide layer constitutes approximately 0.1% to 30% by weight of the doped aluminum oxide layer.
11. (currently amended) The doped aluminum oxide layer of claim-~~1~~2, wherein the aluminum oxide layer has a degree of porosity such that the dopant material filling the pores of the aluminum oxide layer constitutes approximately 0.1% to 10% by weight of the doped aluminum oxide layer.
- 12-15 (canceled)
16. (currently amended) The doped aluminum oxide layer of claim-~~12~~2, wherein the dopant material is silicon formed by a chemical vapor deposition using dilute silane in nitrogen and a substrate temperature of approximately 300°C to 350°C.
- 17-26 (canceled)
27. (previously presented) A dielectric layer, comprising:
an aluminum oxide layer having pores on a surface; and
a second dielectric material embedded in the pores of the aluminum oxide layer;
wherein the second dielectric material is formed of a dopant material selected from the group consisting silicon, zirconium, hafnium and titanium;
wherein the dopant material is embedded in the pores of the aluminum oxide layer after formation of the aluminum oxide layer, such as not to disperse the dopant material throughout the aluminum oxide layer, and the dopant material is subsequently converted to a dielectric form selected from the group consisting of an oxide form and a nitride form; and
wherein the aluminum oxide layer further contains voids below the surface and wherein the voids are free of the second dielectric material.

28-30 (canceled)

31. (currently amended) The dielectric layer of claim-~~26~~ 27, wherein the aluminum oxide layer has a packing density between approximately 0.65 and 0.999.
32. (currently amended) The dielectric layer of claim-~~26~~ 27, wherein the aluminum oxide layer has a packing density between approximately 0.85 and 0.999.
33. (currently amended) The dielectric layer of claim-~~26~~ 27, wherein the dopant material embedded in the pores constitutes approximately 0.1% to 30% by weight of the dielectric layer.
34. (currently amended) The dielectric layer of claim-~~26~~ 27, wherein the dopant material embedded in the pores constitutes approximately 0.1% to 10% by weight of the dielectric layer.
35. (currently amended) The dielectric layer of claim-~~26~~ 27, wherein the aluminum oxide layer has a degree of porosity such that the dopant material embedded in the pores constitutes approximately 0.1% to 30% by weight of the dielectric layer.
36. (currently amended) The dielectric layer of claim-~~26~~ 27, wherein the aluminum oxide layer has a degree of porosity such that the dopant material embedded in the pores constitutes approximately 0.1% to 10% by weight of the dielectric layer.

37-45 (canceled)

46-87 (canceled)

88. (previously presented) The doped aluminum oxide layer of claim 2, wherein the aluminum oxide layer is formed by a method selected from the group consisting of thermal evaporation, electron-beam evaporation and ion-beam-assisted deposition.
89. (previously presented) The doped aluminum oxide layer of claim 88, wherein a degree of porosity of the aluminum oxide layer is controlled during formation of the aluminum oxide layer using a method selected from the group consisting of ion bombardment and plasma activation.
90. (previously presented) The doped aluminum oxide layer of claim 88, wherein a degree of porosity of the aluminum oxide layer is controlled by bombarding the surface of the aluminum oxide layer with oxygen ions during formation.
91. (previously presented) The doped aluminum oxide layer of claim 2, wherein the dopant material is blanket deposited on the aluminum oxide layer.
92. (previously presented) The doped aluminum oxide layer of claim 91, wherein excess dopant material is removed from the surface of the aluminum oxide layer.
93. (previously presented) The doped aluminum oxide layer of claim 91, wherein removing the excess dopant material comprises exposing the excess dopant material to an ion beam.
94. (previously presented) The doped aluminum oxide layer of claim 93, wherein exposing the excess dopant material to an ion beam further comprises exposing the excess dopant material to a beam of argon ions.
95. (previously presented) The doped aluminum oxide layer of claim 91, wherein the dopant material is deposited to a thickness less than or equal to an average diameter of the pores.

96. (previously presented) The dielectric layer of claim 27, wherein the aluminum oxide layer is formed by a method selected from the group consisting of thermal evaporation, electron-beam evaporation and ion-beam-assisted deposition.
97. (previously presented) The dielectric layer of claim 96, wherein a degree of porosity of the aluminum oxide layer is controlled during formation of the aluminum oxide layer using a method selected from the group consisting of ion bombardment and plasma activation.
98. (previously presented) The dielectric layer of claim 96, wherein a degree of porosity of the aluminum oxide layer is controlled by bombarding the surface of the aluminum oxide layer with oxygen ions during formation.
99. (previously presented) The dielectric layer of claim 27, wherein the dopant material is blanket deposited on the aluminum oxide layer and subsequently treated to convert the dopant material to its dielectric form.
100. (previously presented) The dielectric layer of claim 99, wherein excess dopant material is removed from the surface of the aluminum oxide layer prior to converting the dopant material to its dielectric form.
101. (previously presented) The dielectric layer of claim 100, wherein removing the excess dopant material comprises exposing the excess dopant material to an ion beam.
102. (previously presented) The dielectric layer of claim 101, wherein exposing the excess dopant material to an ion beam further comprises exposing the excess dopant material to a beam of argon ions.
103. (previously presented) The dielectric layer of claim 99, wherein the dopant material contains silicon formed by a chemical vapor deposition using dilute silane in nitrogen and

a substrate temperature of approximately 300°C to 350°C, and wherein the silicon of the dopant material is converted to silicon dioxide using rapid thermal annealing in an oxygen-containing atmosphere.

104. (previously presented) The dielectric layer of claim 99, wherein the dopant material is deposited to a thickness less than or equal to an average diameter of the pores.
105. (previously presented) The dielectric layer of claim 27, wherein the dielectric layer is a gate dielectric layer of a field-effect transistor.
106. (previously presented) The dielectric layer of claim 27, wherein the dielectric layer is an intergate dielectric layer of a floating-gate field-effect transistor.
107. (previously presented) The dielectric layer of claim 27, wherein the dielectric layer is a capacitor dielectric layer of a capacitor.